EVERY FORTNIGHT

QUEST

ADVENTURES IN THE WORLD OF SCIENCE

INVENTIONS

43

FACT FILES ON:
- ▶ Space planes
- ▶ Maglev trains
- ▶ Harnessing microwaves
- ▶ High-definition TV
- ▶ Tomorrow's car
- ▶ Camcorders
- ▶ Fighting bacteria
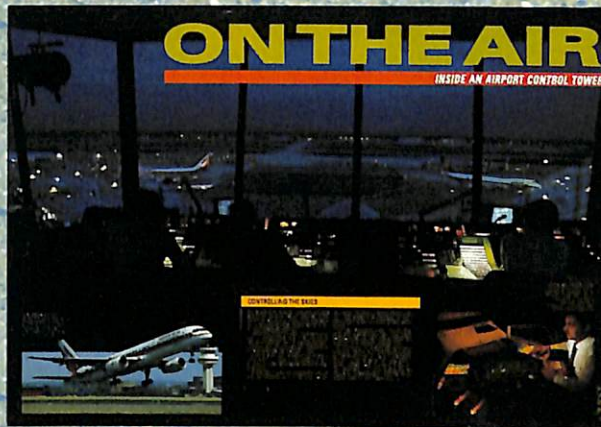
THREE PROJECTS

MODEL: THE X-WING PLANE

GIANT POSTER

FULLY SOR

INSIDE THIS PACK

FACT FILES

▶ Concept cars ▶ Radar ▶ VCRs ▶ Magnetic levitation ▶ Tokyo Ideas Olympics ▶ Battery power ▶ Ramjets ▶ Antibiotics ▶ Wide-screen television ▶ The dashboard computer

ON THE AIR
INSIDE AN AIRPORT CONTROL TOWER

CONTROLLING THE SKIES

POSTER
Airport control tower

MODEL The X-wing

THREE SCIENTIFIC PROJECTS

COMING IN QUEST 44 TOOLS

EVERY FORTNIGHT
QUEST
ADVENTURES IN THE WORLD OF SCIENCE
TOOLS
44
THREE PROJECTS
MAKE A BULLDOZER
FACT FILES ON
Hand-held power tools
Farm machines
Dental instruments
Mega cutters
Space tools
Giant earthmovers
Surgical kit
GIANT POSTER:
WEB-CASTING SPIDER

FACT FILES INCLUDE:

▶ Earth movers ▶ New generation tractors ▶ Power tools ▶ Surgical instruments ▶ Drills and borers ▶ Machine technology

POSTER
Australia's netcasting spider

MODEL
Bulldozer

You will need
Scissors • Ruler • Craft knife • Glue

Before cutting out the pieces, score along all broken lines with a blunt edge and ruler to make folding and gluing easier. Study the ASSEMBLY DIAGRAM to see how the pieces fit together, and use the dotted lines as a guide for positioning.
**NB** Younger children will need supervision when using a craft knife.

To make up
Body
1 Cut out underside **A**. Cut out nose cone **B**, apply glue to underside of flaps and glue to front end of uncoloured side of **A** (see ASSEMBLY DIAGRAM). Cut out **C** and glue undersides of two flaps to top side of **A**.
2 Cut out **D**, remembering to cut out circular hole as well. Fold to shape, folding outer flaps up and inner flaps down. Glue inner flaps into position. Apply glue to undersides of outer flaps and glue into position on **A** and **C** (see ASSEMBLY DIAGRAM).
3 Cut out **E**, cutting slits where indicated. Glue three folds. Fold down flaps on **E** and glue to **D** along positioning dots. Fold down
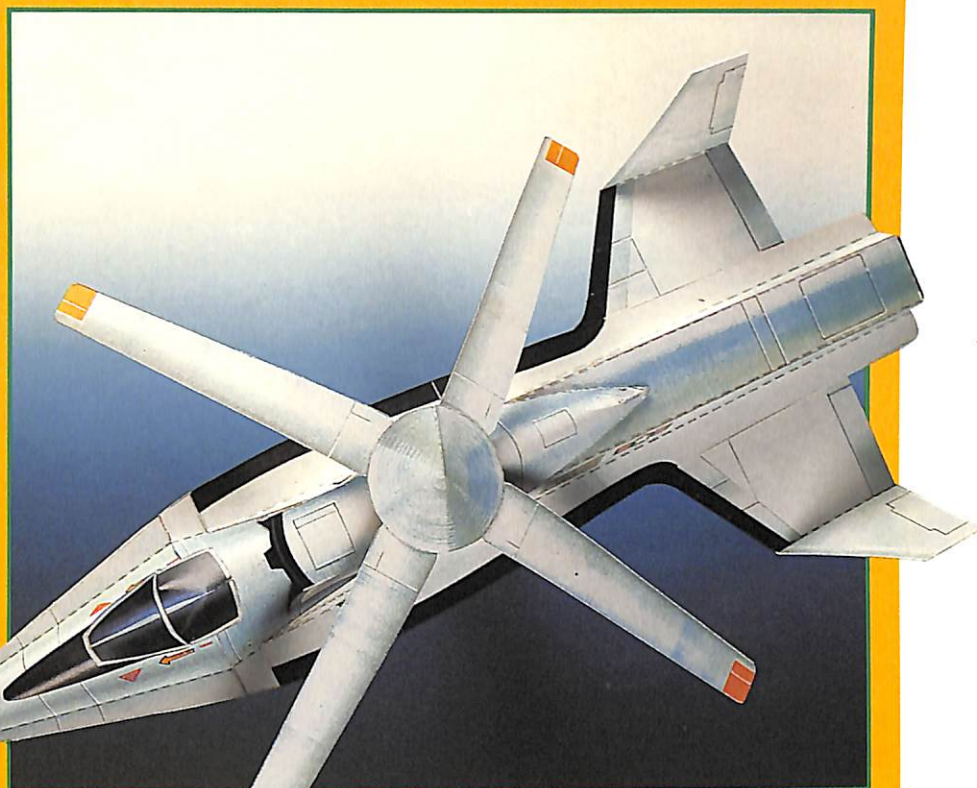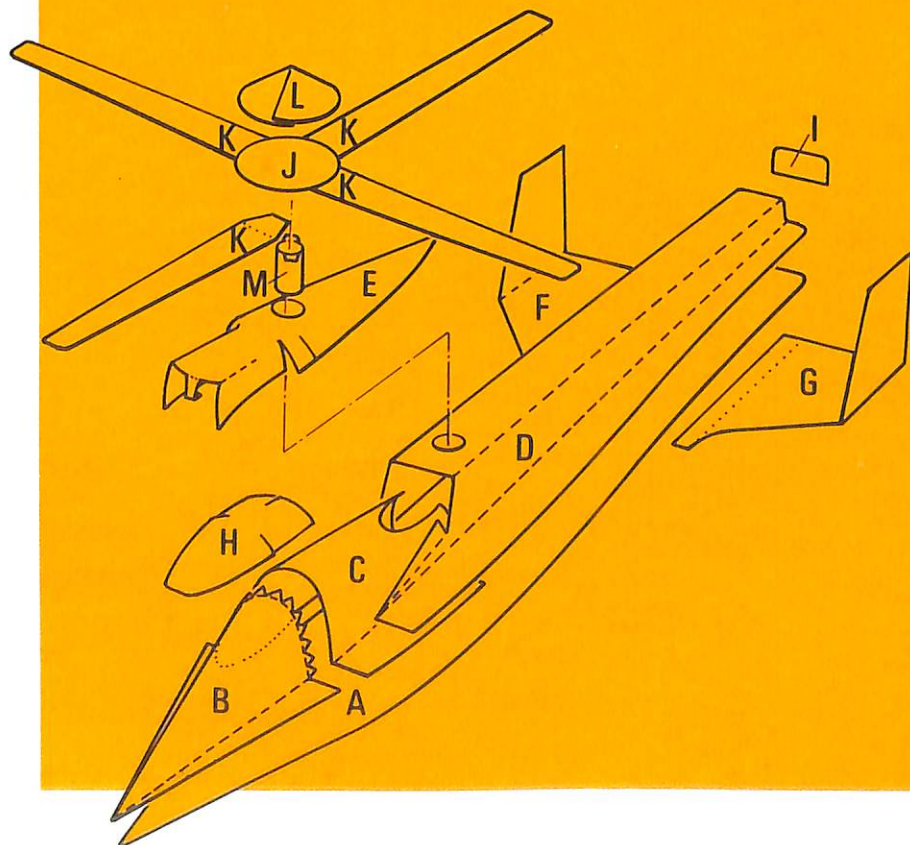
front tab coloured black and glue in place. (see ASSEMBLY DIAGRAM). Stick two large front flaps to **C**.
4 Cut out tailplane and rudder **F**, fold to shape and glue to **A**, following positioning dots. Repeat with tailplane and rudder **G**.
5 Cut out cockpit window **H** and cut three slits. Glue slits down to create gentle curves. Apply glue to back of **H** and place on **B**, following dotted line, holding **H** in position until glue has dried.
6 Cut out **I**. Spread glue on tabs at back of **D** and **A** and stick to **I**.

Rotor-wing
1 Cut out **J** and four blades **K**. Stick inner ends of blades to underside of **J**, following positioning dots, so blades are at right angles to each other.
2 Cut out **L** and glue down fold. Apply glue to underside of **L**, place over **J** and hold in position until **L** is firmly stuck to **J**.
3 Cut out **M** and roll into tube, gluing down flap. Fold tabs out, apply glue and stick to centre of base of **J**. Push **M** through holes in **E** and **D**.

The X-wing is still on the drawing-board. It is designed to hover like a helicopter, the rotor-wing rotating, and fly like an aeroplane with the rotor-wing in a fixed position.

X-WING
PLANE

Q PROJECTS

INVENTIONS

You can make two separate images come together just like a piece of moving film.
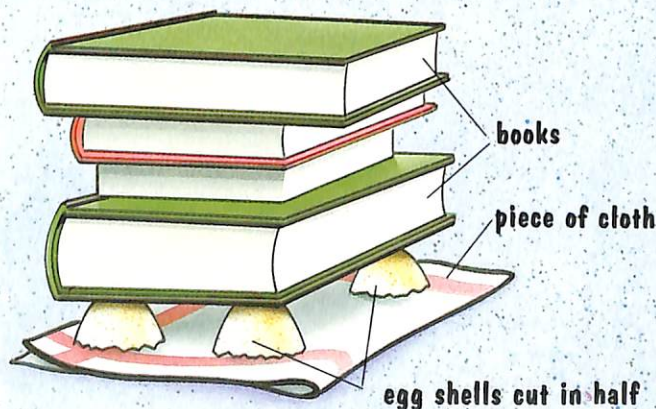
MINI-MOVIES | 1 | ✡ | 3 | 4 | 5 |

You need a piece of stiff cardboard, some thin string, scissors and a pen or pencil. Cut the card into a circle and make two holes in it. Thread a piece of string through each of the holes. On the front of the card draw a cage, and on the back draw a bird. Twist the strings rapidly to make the disc twirl round. Like magic, the bird will appear to be inside the cage. This is because the eye only retains impressions of light for about 1/16 of a second. The same thing happens at the cinema where a series of still images is flashed before your eyes very quickly.

holes for string to go through

cardboard circles

string
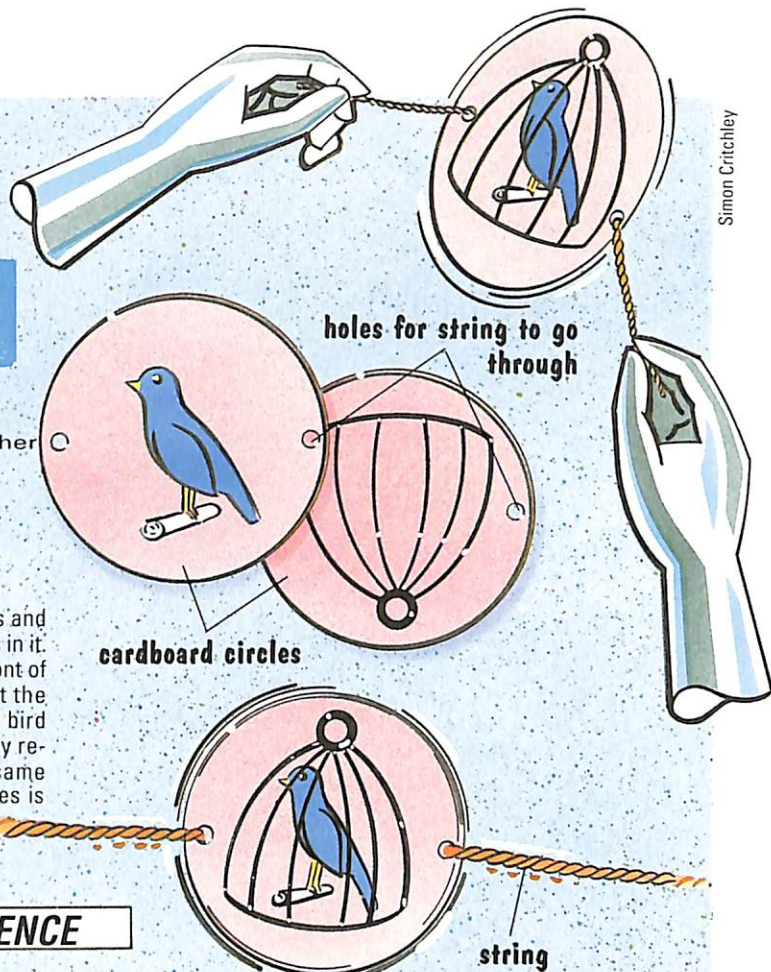
Simon Critchley

ADVENTURES IN THE WORLD OF SCIENCE

STRONG EGGS | 1 | ✡ | 3 | 4 | 5 |

books

piece of cloth

egg shells cut in half

You need four hard-boiled eggs, a knife, a pair of scissors, a bowl of water, a towel and several books. Chop the eggs in half with the knife and discard the yolk and white. Trim each half so that the edges are even. Lay them open side down on the towel and carefully place a book on them. Pile on the rest of the books. You will find that the natural arch-shape of the egg shells can support a considerable weight.

BALLOON TRICK | 1 | ✡ | 3 | 4 | 5 |

balloon

needle

sticky tape

hole
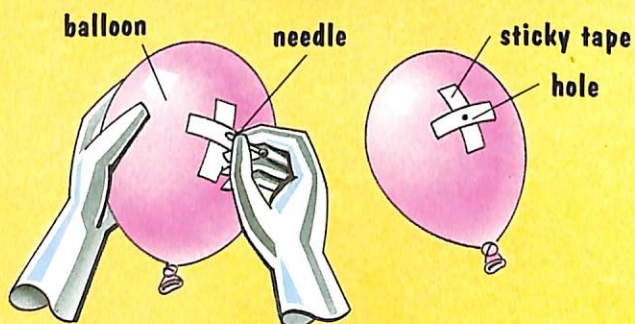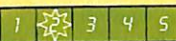
You need a balloon, some sticky tape and a needle or pin. Inflate the balloon and tie it off. Carefully stick a short length of tape anywhere on the balloon, then a second piece across the first to create a cross as shown. Now push the pin or needle through the centre of the cross. The balloon will not pop because the tape prevents the balloon from shrinking. But if you stick the pin anywhere else then the balloon will burst as usual.

PROJECT INFORMATION

| 1 | 2 | ✡ | 4 | 5 |

Each **QUEST** project and model has its own difficulty rating: 1 very simple, 2 simple, 3 intermediate, 4 advanced, 5 complicated.

WARNING!

Every care has been taken to ensure projects are as safe as possible. However, parents should supervise all projects. The publisher can accept no liability for injury.

CONTROLLING THE S

It is the job of the air traffic contro
that aircraft land and take off saf
must keep all planes a safe distan
vertically and horizontally, and de
of planes taking off and landing.
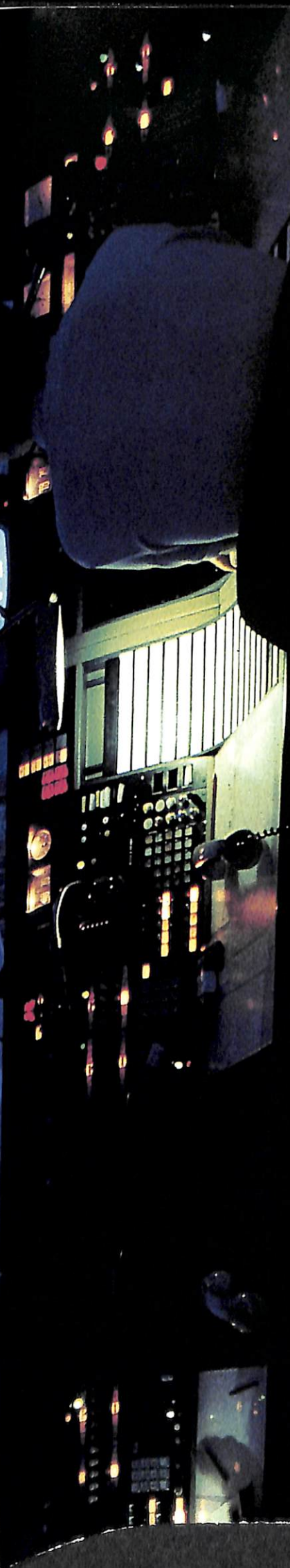
Information about the intention,
vertical position and timing of t
shown on a *flight progress board*, a
tion radar gives the exact position
of all aircraft within the controller's

Data on wind speed and direct
cloud base, air temperature and
pressure are fed to the controller fr
ical centres.

A controller's radar screen pro
plan, as seen from above, of all a

On the final approach to the
airfield, a pilot can lock on to the
instrument landing system (ILS).
This provides a fixed radio beam
so that the aircraft can align
itself with the runway and adopt
the correct descent path.

THE AIR

INSIDE AN AIRPORT CONTROL TOWER

QUEST

Precison Approach Radar enables the controller to monitor the exact path taken by a landing aircraft from 16 km out. The flightpath is shown as a moving dot. A video mapping system makes it possible to superimpose fixed features such as defined airways on the screen.

E Sander/Gamma/Frank Spooner Pictures

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...d *plan posi-*
...and distance
...zone.

...on, visibility,
...barometric
...m meteorog-

...des a visual
...craft within

...KIES

radar range. The aicraft's distance from the airport is indicated by its distance from the centre of the screen, and its bearing by the angle to the centre.

The controller communicates with aircraft pilots by VHF radio telephone, with a range of up to 300 km when the aircraft is at high altitude. The range decreases when the plane descends.
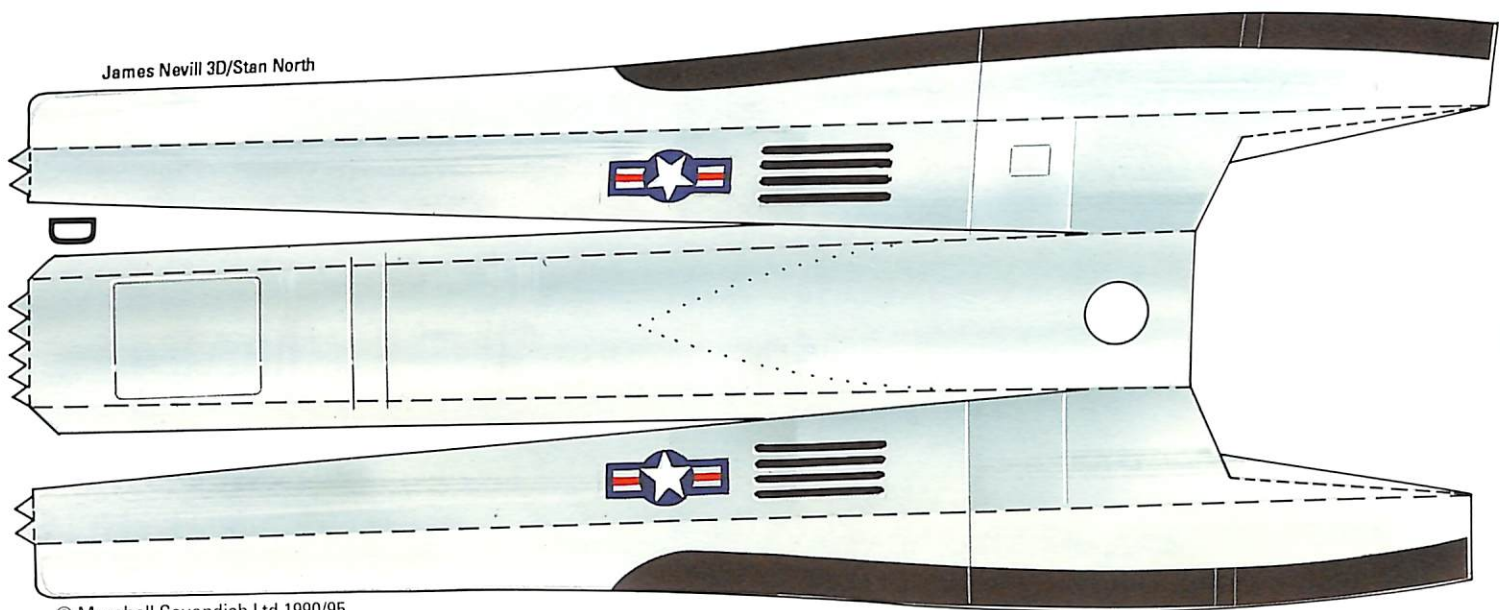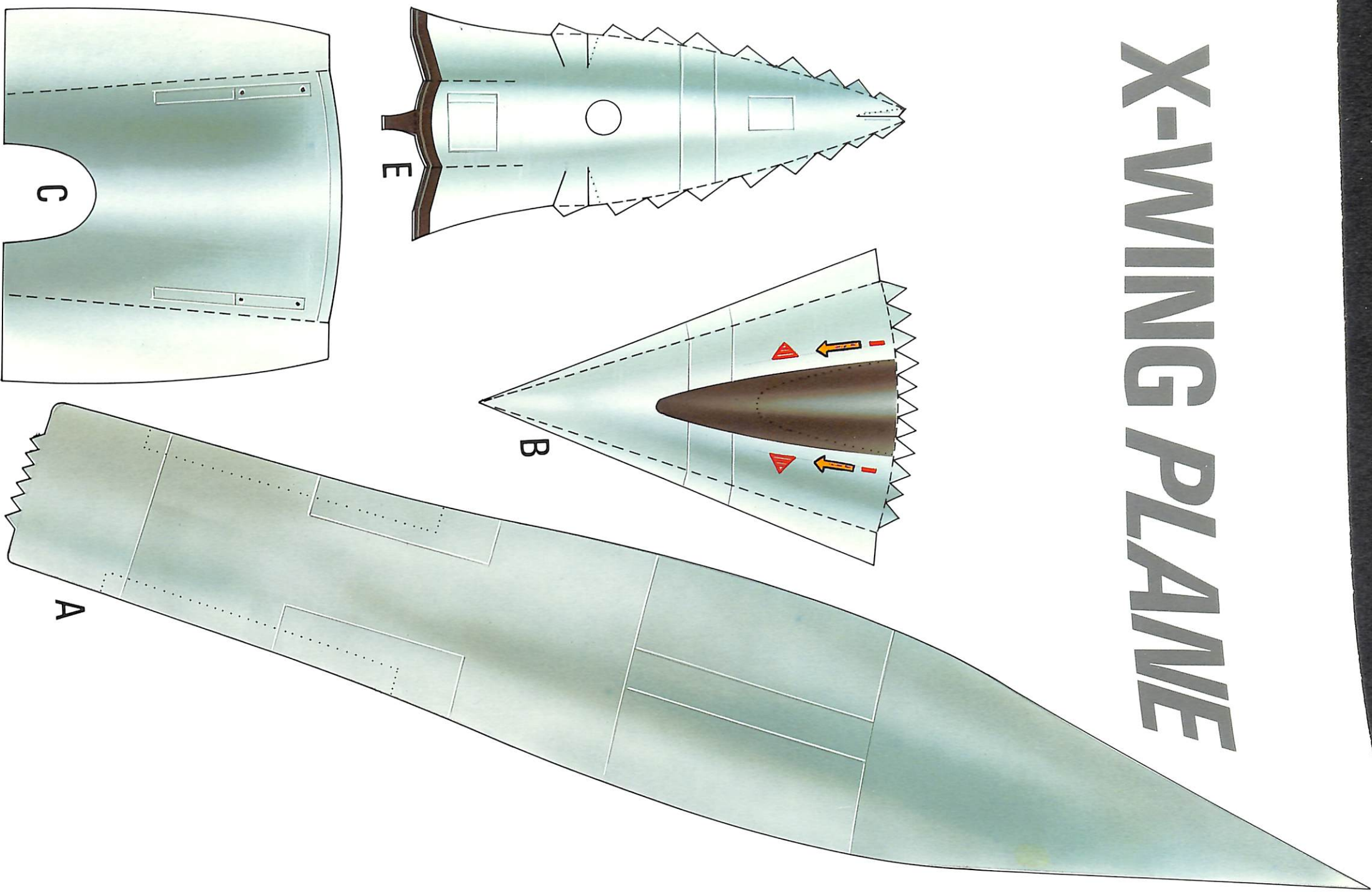
Air traffic control centres (ATCs) receive a continuous stream of flight data from airports and adjoining areas. All inputs are then processed through high-power computers to provide controllers with essential up-to-the-second information. Incoming flight plans, for example, are held in computer store until the aircraft concerned are entering the area.

X-WING PLANE

C

E

B

A

James Nevill 3D/Stan North

D

M

H

I

L

K

K

K

K

F

G

J